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$$\left. \begin{aligned} dp &= rdx + sdy \\ dq &= sdx + tdy \end{aligned} \right\}$$

and integrate again. The values of  $p$  and  $q$  thus found are to be substituted, finally, in the equation

$$dz = pdx + qdy,$$

and by a third integration the solution required is, in general, determined. It will be evident that in the processes of successive integration indicated, five arbitrary constants are introduced.

JOSEPH HUBAND SMITH, Esq., read a paper—

ON THE ANCIENT NORSE AND DANISH GEOGRAPHY OF IRELAND.

AFTER some observations upon communications made to the Academy by the late Mr. George Downes, in the years 1838-9 and 1841, and having referred also to the labours of Dr. William West, who had died in 1837, while engaged in preparing an Essay on the Ancient Geography of Gaul and the British Isles, intended to be laid before the meeting of the British Association, then approaching, Mr. Smith proceeded to read some passages from recently-discovered copies of our ancient annals, illustrative of the military occupation of Ireland by the Vikings, who arrived from Scandinavia at various periods, commencing towards the close of the eighth century of our era, and continued a long series of contests with the aboriginal inhabitants of Ireland, and subsequently with each other, during the four succeeding centuries.

From passages in the Icelandic and other Sagas, he showed that a constant intercourse had been maintained at first by the Norwegian sea rovers, who had gained a footing in the Orkneys, and afterwards by others, described in the Irish annals by the names of Lochlanns, Gentiles, and Finn Ghaoill, and Dubh Ghaoill, not only of a warlike nature, but also of a trading or mercantile character. The names of various localities which he instanced,—beginning with the Orkneys, the Faro-Islands, and the Hebrides,—all, he contended, indicated the progress of the war vessels of the various tribes; and he pointed out the harbours and islands along the eastern coast of Ireland, whose names (some as recorded in the Sagas, and others preserved to the present day) were unmistakeably of Norwegian and Icelandic origin, and quite distinct from the Celtic names by which these places were known to the Irish writers of the same period. Among others, Mr. Smith instanced Strangford bay, Carlingford, the little islands of Lamb-ey, and Ireland's-ey; the harbour of Bullock or Blowyk, and the adjacent island and sound of Dalkey; the headlands of Wicklow, or Wykynge-lo, and Arc-lo; the harbours of Wexford and Waterford, as well as that of Smerwick, on the western coast, not far from the River Shannon,—in all of which the Norwegian or Danish Vikings had sheltered successive fleets, and in most cases erected on their shores military fortresses of considerable strength. Some other places named in the Sagas,—for example, Gunvallsborg,—Mr. Smith admitted he was as yet unable to identify satisfactorily with any modern localities. He then adverted to the modern names of three of

the four provinces of Ireland as clearly indicative of Scandinavian occupation. It had been suggested that the suffix *ster*, added to the Irish names of those three, had been by some scholars held to be of Saxon origin, derivable from a root in that language implying *government*, or rule; but Mr. Smith showed that this opinion was incorrect; and adduced proofs from the writings of eminent Norse and Danish philologists, as well as from a comparison with cognate terms in the Irish or Celtic language.

In speaking of the permanent settlement which the Northmen, or Easterlings, as they were often termed, had effected in Dublin—or, as they called it, Dyflinar-shire,—and where they maintained the state of *reguli* or kings, he described its extent, not only inland, but also including a long line of coast, from the little river called the Nanny Water, in the county of Meath, to Arklow Head, which (upon the authority of Mr. Charles Halliday, who had devoted much attention to matters connected with the port of Dublin and its commercial interests), Mr. Smith stated to be coextensive with, and, as nearly as possible, occupying exactly the same length of sea-shore as that along which the mayor and corporation of Dublin, under the government of England, have for the last seven hundred years exercised jurisdiction. He commented on the fact, that, while native authorities all showed that the Irish retained in their own language distinct names for the harbours and islands occupied by the Northmen,—thus exhibiting an inextinguishable feeling of hostility,—the Norse names had been adopted and preserved by the English and Norman invaders of Ireland in the twelfth century, who had continued the same line of policy towards the aborigines as that which had been pursued by the Norsemen and the Danes: thus giving the clearest evidence of a remarkable identity of language and of race.

Various passages from our annalists were read by Mr. Smith, in evidence of their impartiality and adherence to truth, as shown in their admissions that many of the native Irish united with the Lochlanns, the Norwegians, and the Danes, in their expeditions and forays into the interior of the country, for the purposes of plunder and taking preys.

In a brief reference to the celebrated battle of Clontarf in the eleventh century, in which the Northmen of Dublin sustained a signal defeat, Mr. Smith pointed out the circumstance that one of the most distinguished of the Norwegian leaders was Sichfrith mac Lodair, Jarl of Orkney, who was slain in that battle. The narrative of a still later engagement, towards the close of the twelfth century, between Miles De Cogan and Asgall, son of Ragnvald, or Reginald, King of Dublin, in which the Danes of Dublin sustained a signal defeat, showed that the Danish power was not till then totally overthrown.

In conclusion, Mr. Smith called attention to the important assistance which would be given to the elucidation of the entire of this period of our history, from the geographical identification of the various places mentioned in the Norse accounts of Ireland, and in the Sagas, without which the records of the time, during which they maintained a military occupation of so many places on our coasts—will still require much investigation; and finally suggested that there was reason to think

that the trading spirit and skill in navigation which had been then imparted by the Northmen to the inhabitants of Ireland of the Celtic race, had exercised a much greater, and perhaps more beneficial, influence on the subsequent destinies of this country than had been usually supposed.

Mr. Smith further intimated an intention of submitting to the Academy, on some future occasion, the results of his investigation of the Norse geography of the Faroe and Shetland islands, and other islands on the western coast of Scotland and the Isle of Man.

The Rev. Joseph A. Galbraith communicated an abstract of the "Barometrical Observations made at the Magnetical Observatory, Dublin, before and during the Storm of the 7th and 8th February, 1861."

MONDAY, FEBRUARY 25, 1861.

REV. GEORGE SALMON, D. D., Vice-President, in the Chair.

THE REV. J. A. GALBRAITH laid before the Academy the following

TABLES AND DIAGRAMS RELATIVE TO THE RAIN-FALL AS OBSERVED IN THE  
MAGNETIC OBSERVATORY OF TRINITY COLLEGE.

Table I. gives the annual and monthly rain-falls for the last ten years, 1851-1860.

Table II. gives the monthly rain-falls of the ten years (1841-1850) as compared with those of the last ten years (1851-1860).

The numbers for the first ten years are taken from Dr. Lloyd's account of the Meteorology of Ireland, vol. xxii. of the Transactions of the Academy.

From this Table it appears that the mean rain-fall at Dublin for twenty years (1841-1860) = 29.02 inches.

Table III. gives the distribution of the rain-fall, according to the seasons, for ten years (1851-1860), from which the following mean values are obtained :—

|  |      |
|--|------|
| Spring (March, April, May), . . . . .            | 6.33 |
| Summer (June, July, August), . . . . .           | 7.81 |
| Autumn (September, October, November), . . . . . | 7.73 |
| Winter (December, January, February), . . . . .  | 6.76 |

In computing these mean values, the rain-falls for January and February, 1861, as taken from the day-book of the Observatory, were used as follows :—

|                     |      |
|---------------------|------|
| January, . . . . .  | 2.18 |
| February, . . . . . | 3.67 |

It may be observed that the month of February, 1861, has been the wettest February for the last twenty-one years, the rain-fall being more than double the average amount.

Table IV. gives the number of dry days in each month for the last ten years (1851-1860). In this Table a day is counted dry if the rain-fall is less than a hundredth of an inch.

Average number of dry days in the year = 191.6  
Average number of wet days in the year = 173.4